

## A TRANSVERSE INCISION FOR THE REMOVAL OF THE APPENDIX.<sup>1</sup>

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THE most popular incision at present for the removal of the appendix is probably that first described by Battle (*Brit. Med. Journ.*, 1895, ii, p. 1360) and later by Jalaguier (*La Presse Médicale*, 1897) and Kammerer (*ANNALS OF SURGERY*, 1897, xxvi, 225). It is made along the outer edge of the rectus muscle, and the skin being drawn toward the median line the anterior layer of the sheath of the rectus is incised longitudinally. The rectus is then displaced inwardly, and such portion of the sheath as may be present, and the transversalis fascia and peritoneum incised posteriorly. This operation was modified by Lennander (*Cent. für. Chirurg.*, 1898 xxv, 90) and Edebohls (*Med. Record*, 1899, p. 665) by going directly through the fibres of the rectus instead of drawing it to one side and the method is used at least by many for all kinds of cases, suppurative and otherwise.

The operation of McBurney (*ANNALS OF SURGERY*, 1894, vol. xx, p. 38) is also frequently used. He made an incision four inches long in the direction of the fibres of the external oblique about one inch from the anterior superior spine crossing a line drawn from it to the umbilicus nearly at right angles. One third of the incision is above this line. The external oblique fibres were divided in the line of the skin incision and the internal oblique and transversalis fibres parted in a direction nearly at right angles to those of the muscle above.

Harrington (*Boston Med. and Surg. Jour.*, Aug. 1899) and Weir (*Med. News*, Feb. 17, 1900, 241) suggested continuing the separation of the internal oblique and transversalis inward by dividing the sheath of the rectus and pulling it toward the median line. This was done in order to obtain additional room in cases in which the McBurney incision had

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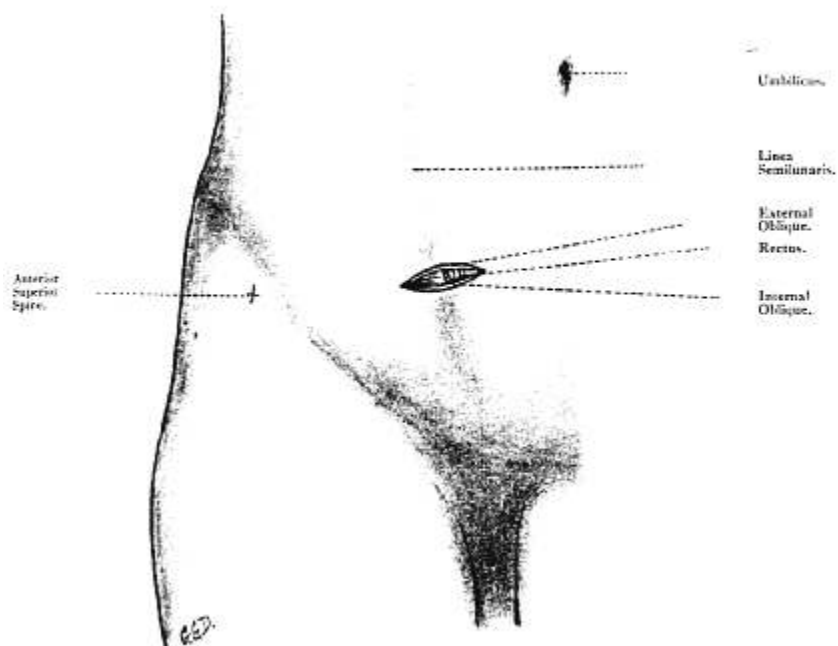


FIG. 1.—Small incision for simple cases.

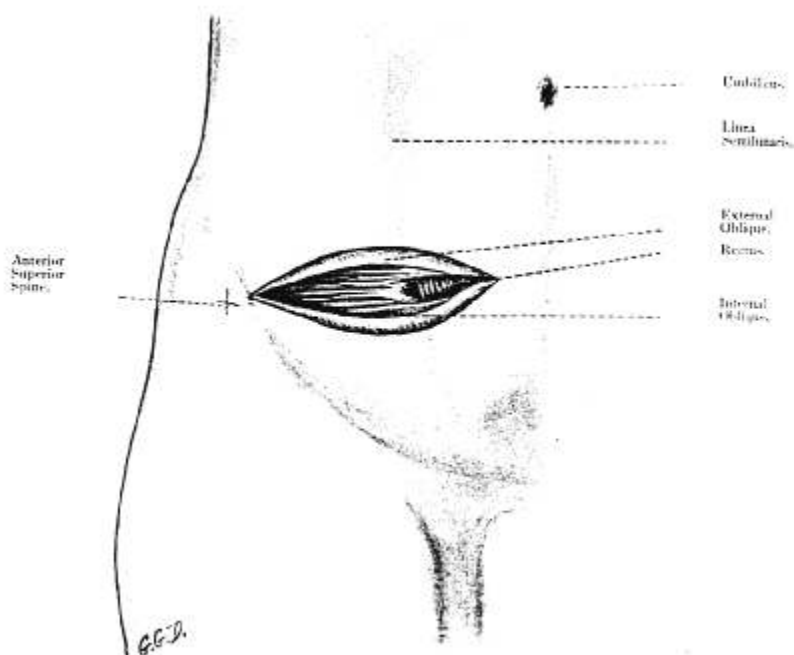


FIG. 2.—Large incision for difficult cases.

been found to be insufficient. Quite recently I have come across the paper of J. W. Elliot, (*Boston Med. and Surg. Journal*, 1896, vol. ii, p. 433) which seems to have been overlooked by most surgical writers. He made his incision beginning at half an inch inside of the linea semilunaris. The external oblique was divided in the line of the skin incision and the internal oblique and transversalis were divided in the direction of their fibres and in the line of the incisions above. If more room was desired he suggested that the incision could be prolonged along the linea semilunaris or into the rectus muscle if necessary.

It is thus seen that there are three ways of operating—one through the sheath of the rectus longitudinally, another by McBurney's operation with the Harrington and Weir addition and the third the transverse incision of J. W. Elliot through the external and internal oblique and transversalis muscles.

Of the longitudinal incision of Battle and its modification of going directly through the rectus the former seems the better for the following reasons: The incision through the muscle weakens it at this point. In Battle's operation the rectus presents an intact muscle to resist the inside pressure and the incisions through the sheath are overlapped by the muscle slipping back into place. In the modified operation there is left a straight scar from the skin to the peritoneum. Division or parting of the muscle is certain to wound some of the branches of the deep epigastric artery or even sometimes the main trunk. This is more apt to be the case if the fibres are parted from above down than from below up. In longitudinal incisions generally the nerves supplying the rectus are liable to be cut through as well as the vessels. These nerves are motor in character as well as sensory and come from the tenth, eleventh and twelfth intercostals. If cut they, like other motor nerves, do not tend to unite. If large incisions are needed the amount of muscle paralyzed is considerable. If drainage is used it is brought out directly through the lower angle of the wound and it is needless to point out how favorable this is to the production of hernia.

Paralysis of a part of the rectus is recognized by, first, the operated side of the abdomen protruding more than the sound

side and, secondly, by observing that when the rectus contracts the scar is dragged up by the uninjured part of the muscle while the paralyzed lower portion offers no resistance. Another objection to incising the sheath of the rectus pointed out to me by Dr. Porter is that infection may travel along beneath it instead of coming up to the surface. McBurney's operation is good in easy cases but in difficult and suppurative operations it does not give sufficient room and makes a nasty wound if infected and unsuitable for efficient drainage. The operations of Harrington and Weir possess all the objections of the McBurney with the exception of the slight additional space gained by displacing the rectus.

*Proposed Incision.*—For easy cases the incision is made directly transverse one and a half inches long. Its center is to be on the semilunar line on a level with the anterior superior spine. The aponeurosis of the external oblique is divided in the line of the skin incision but obliquely to the direction of its fibres. The fibres of the internal oblique and transversalis muscles are parted—not cut—in the same line as the structures above. The peritoneum is then opened and the incision carried inward through first the anterior layer of the sheath of the rectus. A blunt retractor three-quarters of an inch wide is then inserted and the muscle drawn toward the median line. This exposes the transversalis fascia and peritoneum posteriorly which are then also divided. Thus is obtained a triangular opening with its base of three quarters of an inch and two sides of about an inch long which is ample for simple cases.

*For Difficult Cases.*—If the case is a difficult one the outer end of the incision is prolonged to the anterior spine or even above and inwardly through the sheath of the rectus to within an inch of the median line. This will give an opening four to five inches long according to the size of the patient, sufficiently large to insert the hand if necessary and through which the appendix can be extracted under almost all circumstances.

The operation was developed as follows: Previous to about eight years ago the incision parallel to Poupart's ligament dividing all structures in the line of the skin incision was used. About that time, desiring to avoid the transverse division of the muscular fibres of the internal oblique and transversalis, the incision was made higher up on the abdomen,

practically Elliot's operation. It began where a line from the femoral artery to the umbilicus crossed the linea semilunaris (about opposite the ant. sup. spine) and went outward and slightly upward toward the crest of the ilium. In cases requiring a large incision room was obtained outwardly and the ascending branch of the circumflex iliac artery was divided. It was to avoid doing this that for the past two years the incision as above described has been used. The center of the incision on the linea semilunaris opposite the anterior spine is almost over the base of the appendix. Sometimes it is higher, more rarely it is lower, in either case it is easily within reach. The ileo cæcal junction lies three-quarters of an inch above the base of the appendix so that one serves as a guide to the other. The incision is designed to avoid wounding arteries. The deep epigastric always enters beneath the edge of the rectus muscle below the level of the anterior superior spine and its main trunk is out of the way. To divide and ligate the epigastric vessels as suggested by Weir appears to be an objectionable and unnecessary procedure. As the deep epigastric proceeds upward it lies on the under surface of the muscle at about its middle or often a little toward the outer side, sending branches to each side, the larger ones going outward. They are usually drawn aside when the muscle is retracted even in extensive operations.

At the outer angle of the wound no vessels will be divided unless the incision is carried upward and backward beyond the anterior spine as the ascending branch of the deep circumflex iliac is given off and proceeds upward just above the anterior spine. As the deep muscles are divided in the direction of the nerves these are not injured as occurs in longitudinal incisions through the rectus. The appendix in this incision is particularly accessible because its center lies almost over the base of the appendix. In the longitudinal incisions through the rectus they lie to the inner side of the base of the appendix and if it points to the right and is retro-cæcal the operator encounters the objection pointed out by McBurney of having to work outward under a shelf of tissue made by the outer margin of the wound.

In cases in which drainage is necessary the drain is brought out at the outer angle of the wound and lies close to

the bony anterior superior spine and passes through the thick muscular mass of the internal oblique and transversalis, all of which ensures against the formation of a hernia at that point.

The inner portion of the wound is protected absolutely against hernia by the rectus muscle, and to its outside there are the thick internal oblique and transversalis muscles beneath, and above them the aponeurosis of the external oblique. The aponeurosis of the external oblique does not blend with the sheath of the rectus at the linea semilunaris but joins it at about one-third of the distance between the linea semilunaris and the linea alba. The division of the external oblique aponeurosis obliquely instead of parallel to the direction of its fibres may be urged as an objection but this is more than compensated for by the better access which is afforded. No hernias have come under my observation even in suppurative cases.